

Automated Content Syndication

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Background

Automation of building, testing, and deploying software and updates has become the norm for modern software.

SNOMED CT has been distributed for many years largely via manual website download and some SFTP/FTPS sites. While download automation has been achieved in some cases, typically it has not been well adopted.

The method also varies for retrieving national extension releases from extension builders who have different release sites and infrastructure, often due to organisational constraints. Implementers also typically need code systems in addition to SNOMED CT, which typically come from yet more places.

Continuous Delivery

In order to support more frequent delivery, or even continuous delivery, the current content distribution model needs to become more sophisticated and standardised.

Ideally a common standard would exist that implementers can integrate to once for release content and metadata, and this standard would be implemented across all publications.

Candidate Solution – W3C Atom

Atom is a syndication feed standard from the W3C which meets the need reasonably well. Atom is defined by two specifications, the **Atom Syndication Format** and the **Atom Publication Protocol (AtomPub or APP)**.

The Atom Syndication Format is an XML format representing the feed and its metadata

- Title
- Unique identifier
- Last date/time of update
- Link (URL)
- Generator (publisher)

With sub-elements for each of the “entries” (artefacts being syndicated) in the feed, each with metadata describing the entry’s

- Title
- Unique identifier for the entry
- Initial publication date/time
- Link (URL)
- Copyright statement
- Textual summary of the artefact
- Category
- Last date/time of update
- Author

The Australian Digital Health Agency and CSIRO have defined and implemented a content syndication specification for terminology on top of Atom in the National Clinical Terminology Service (NCTS) - <http://www.healthterminologies.gov.au>

The specification is a very light profile over Atom and defines in addition to the base Atom specifications

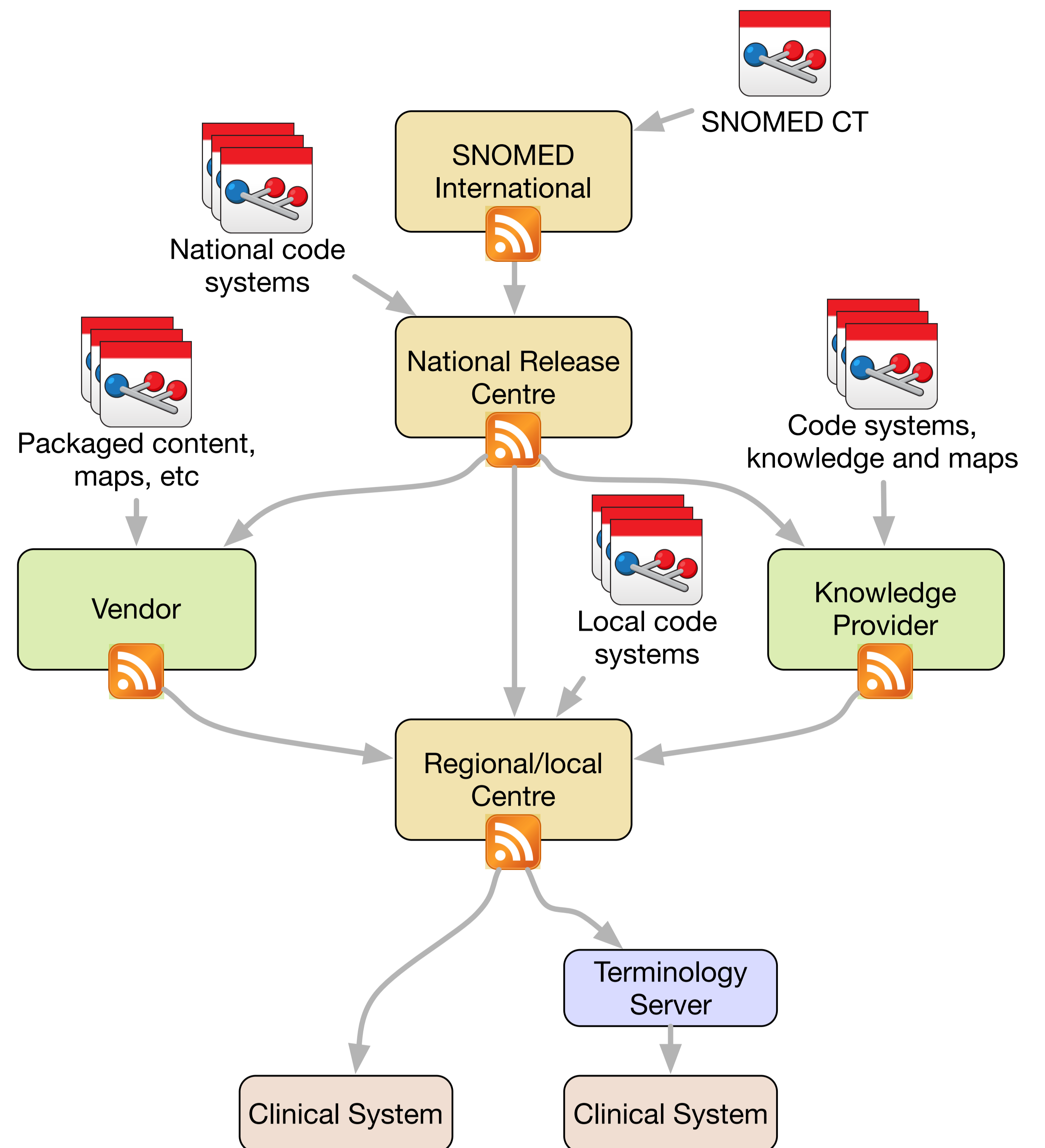
- A SHA256 checksum for each artefact in the syndication feed
- Content Item Identifier – native identifier of the content, for SNOMED CT resources this is an Edition URI from the SNOMED CT URI Specification
- Content Item Version– native version of the content, for SNOMED CT resources this is a Version URI from the SNOMED CT URI Specification
- Content Instance Identifier - identifies the content instance, identifier plus version. For SNOMED CT this is a Version URI from the SNOMED CT URI Specification
- FHIR profile– used to indicate the profile a syndicated FHIR resource conforms to
- SCT Base Version– SNOMED CT version to which an RF2 Delta package entry relates

There are also an extensible set of content types defined for

- SNOMED CT RF2
- LOINC
- FHIR resources

CSIRO also define a content type for Ontoserver binary indexes so prebuilt and quality assured indexes may be syndicated to Ontoserver instances. This allows fast, push-button content updates for Ontoserver instances.

Example syndication hierarchy



Advantages

This solution builds upon an existing W3C standard to enable hierarchical syndication services that can add content (code systems, value sets, maps) relevant at each level. Participating syndication server owners may update their content from upstream content publisher/s when they choose (pull model), and augment that content with content that is relevant in the scope of their service.

Standard library code can be applied by multiple software developers, enabling them to get content updates using a common API for a variety of content offered.

Implementation

This is the model being applied in Australia, with the National Syndication Server ultimately containing all code systems required to support national specifications. This model allows state health departments in Australia to automate retrieving updates to national code systems, but also manage a master server of their locally required code systems for automated syndication to their clinical systems. It also allows vendors, knowledge providers and other code system providers to offer the same open interface to ease the distribution of their content.

So far this has been implemented by CSIRO’s Ontoserver which has a syndication client able to take native terminology releases, FHIR resources or prebuilt binary indexes from the (NCTS) syndication server. An Ontoserver instance can also act as a syndication server and advertise its content as well as upstream content via the same API.

A major Australian vendor, has also implemented a syndication client to retrieve content releases from the National Clinical Terminology Service.

The NCTS’s syndication feed is also used to drive the manual download webpages on the NCTS’s website.

W3C Atom Syndication Format <https://tools.ietf.org/html/rfc4287>

W3C Atom Publication Protocol <https://tools.ietf.org/html/rfc5023>

NCTS syndication feed
<http://api.healthterminologies.gov.au/syndication/v1/syndication.xml>

NCTS National Syndication Server
<https://www.healthterminologies.gov.au/tools?content=nss>



NCTS syndication feed



NCTS National Syndication Server

```
<?xml version="1.0" encoding="UTF-8"?>
<feed xmlns="http://www.w3.org/2005/Atom" xmlns:ncts="http://ns.electronichealth.net.au/ncts/syndication/asf/extensions/1.0.0">
  <title>National Clinical Terminology Service Syndication Feed</title>
  <link rel="alternate" type="application/atom+xml" href="https://api.healthterminologies.gov.au/syndication/v1/syndication.xml" />
  <id>urn:uuid:e39958d4-380e-4252-8707-6afeff8b7911</id>
  <generator>Australian Digital Health Agency</generator>
  <updated>2017-09-25T07:10:14Z</updated>
  <ncts:atomSyndicationFormatProfile>http://ns.electronichealth.net.au/ncts/syndication/asf/profile/1.0.0</ncts:atomSyndicationFormatProfile>
  <entry>
    <title>SNOMED CT-AU 30 April 2017 (RF2 FULL)</title>
    <link rel="alternate" type="application/zip"
      href="https://api.healthterminologies.gov.au/syndication/v1/gov/ehealthterminology/snomedct-au/NCTS_SCT_RF2_DISTRIBUTION_32506021000036107/20170430/NCTS_SCT_RF2_DISTRIBUTION_32506021000036107-20170430-FULL.zip" length="149292292"
      ncts:sha256Hash="e2ed6dd252f6fd791ec76cc4495fbc39034b121cdbcdb1a7da46372c8f7db9b7" />
    <category term="SCT_RF2_FULL" label="SNOMED CT RF2 Full" scheme="http://ns.electronichealth.net.au/ncts/syndication/asf/scheme/1.0.0" />
    <author>
      <name>Australian Digital Health Agency</name>
      <uri>http://www.digitalhealth.gov.au</uri>
      <email>help@digitalhealth.gov.au</email>
    </author>
    <id>urn:uuid:651a7443-afa9-3085-81c8-62b762b6a474</id>
    <rights>Copyright 2016 Australian Digital Health Agency...</rights>
    <updated>2017-05-17T01:11:01Z</updated>
    <published>2017-04-19T00:01:51Z</published>
    <summary>SNOMED CT-AU is the Australian extension to the Systematized Nomenclature of Medicine, Clinical Terms (SNOMED CT)...</summary>
    <ncts:contentItemIdentifier>http://snomed.info/sct/32506021000036107</ncts:contentItemIdentifier>
    <ncts:contentItemVersion>http://snomed.info/sct/32506021000036107/version/20170430</ncts:contentItemVersion>
  </entry>
</feed>
```